Clinical Guideline

MANAGEMENT OF COMMUNITY ACQUIRED PNEUMONIA

SETTING
Bristol Royal Hospital for Children, Emergency Department & Wards

FOR STAFF
Clinical staff – Medics, Nurse Practitioners and Nurses

PATIENTS
Previously healthy children with community acquired pneumonia

GUIDANCE
Community acquired pneumonia (CAP) should be considered in children with persistent or repetitive fever ≥38 °C together with chest recession and rapid respiratory rate.

Children with CAP may present with fever, tachypnoea, breathlessness or difficulty breathing, cough, wheeze, chest pain, abdominal pain and/or vomiting.

Children with upper respiratory tract infection and generalised wheeze with low-grade fever do not have pneumonia.

Common Organisms
- Streptococcus pneumonia is the commonest cause of bacterial pneumonia
- Viruses account for 30-67% of childhood CAP, more frequently in those <1 year
- One third of childhood CAP (8-40%) represent a mixed infection

Severity Assessment
Severity assessment should be performed for all children with CAP and should document:
- Heart Rate, Respiratory Rate, Oxygen saturations
- Capillary refill time (CRT)
- Difficulty breathing
- Grunting and/or apnoea
- Feeding (fluid) history and signs of dehydration
- Chronic conditions

Investigations

Pulse oximetry
- Should be performed in all children with CAP.

Radiology
- Chest x-ray should not be seen as a routine investigation in CAP, and children with signs and symptoms of CAP who are not admitted to hospital should not have a chest x-ray.
- Chest x-rays are not helpful in differentiating bacterial from viral causes.

Acute phase reactants (CRP & ESR)
- Do not distinguish viral from bacterial infections and should not be routinely tested.
- May be useful in admitted patients to monitor progress (especially those on IV therapy).

Microbiological investigations
- Should not be performed routinely in children with mild CAP and those not admitted to hospital
- Should be performed in children with severe pneumonia requiring HDU/PIC care and those with complications
- Microbiological investigations include
  - Blood cultures
  - Nasopharyngeal aspirates for viral PCR and/or immunofluorescence in children under 18 months
  - Acute and convalescent serology for respiratory viruses, Mycoplasma and Chlamydia should be considered in cases where a microbiological diagnosis is not reached during acute illness

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Indicators of severe pneumonia requiring hospital admission

- Oxygen saturations ≤92%
- Significant tachypnoea
  - Respiratory rate >70 in infants <12 months
  - Respiratory rate >50 in children over 12 months
- Significant tachycardia (out of keeping with fever)
- Prolonged CRT (>2 seconds centrally)
- Difficulty in breathing
- Grunting and/or apnoea
- Not feeding and/or signs of dehydration
- Chronic conditions, especially those with respiratory or neuromuscular components

Management

- Patients with oxygen saturations ≤92% in air should be treated with oxygen given by nasal cannulae, head box, face mask or high flow oxygen delivery device to maintain oxygen saturation >92%.
- Intravenous fluids when required should be 0.9% saline given at 80% maintenance rates.
- Those on IV fluids require baseline and daily monitoring of plasma sodium, potassium, urea, creatinine.
- Chest physiotherapy is not beneficial and should not be performed in children with pneumonia.

Antibiotics (Table 1)

All children with a clinical diagnosis of CAP should receive antibiotics as bacterial and viral pneumonia cannot be reliably distinguished.

Choice of antibiotic

- Amoxicillin is the first choice oral antibiotic because it is effective against the majority of pathogens, is well tolerated and cheap.
- Macrolide antibiotics may be added at any age if there is no response to first-line empirical therapy.
- Macrolide antibiotics should be used if mycoplasma or chlamydia pneumonia is suspected and in very severe disease.
- In pneumonia associated with influenza, co-amoxiclav is recommended.

Route of antibiotic treatment

- Oral antibiotics are safe and effective for children presenting with even severe CAP
- Intravenous antibiotics should be used only when the child is unable to tolerate oral fluids or absorb oral antibiotics (e.g. because of vomiting) or presents with signs of septicaemia or complicated pneumonia
- The first line intravenous antibiotic is co-amoxiclav
- Intravenous antibiotics should be changed to oral antibiotics if there is clear evidence of improvement

Complications

If a child remains pyrexial or unwell 48 hrs after commencing treatment the following must be assessed:

- Is the patient having appropriate drug treatment at an adequate dose?
- Is there a lung complication of pneumonia such as empyema or evidence of lung abscess?
- Is the patient not responding because of a complication in the host such as immunosuppression or co-existent disease such as cystic fibrosis?

Pleural effusions and empyema

- Parapneumonic effusions develop in 1% of all patients with CAP but up to 40% of admitted patients.
- Empyema should be suspected in children with a persistent fever despite adequate antibiotic treatment
- Refer to trust guideline on management of empyema

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Table 1: BRHC Antibiotic guideline for CAP

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<th>Infection</th>
<th>Drug and Dose</th>
<th>Course length</th>
<th>Comments</th>
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</table>
| Community Acquired Pneumonia Non severe (Non neonatal) | Amoxicillin  
1 month–1 year: 125mg po tds  
1-5 years: 250mg po tds  
5-18 years: 500mg po tds  
If suspicious of atypical pneumonia add  
Clarithromycin  
1 month–12 years:  
<8kg: 7.5mg/kg po bd  
8-11kg: 62.5mg po bd  
12-19kg: 125mg po bd  
20-29kg: 187.5mg po bd  
30-40kg: 250mg po bd  
12-18 years: 250-500mg po bd  | 7-10 days | Consider *Staphylococcus aureus* post influenza.  
If specific pathogen identified longer therapy may be required e.g. *S aureus*, atypical or, gram-negative infection. |
| Penicillin allergic                              | Clarithromycin  
1 month–12 years:  
<8kg: 7.5mg/kg po bd  
8-11kg: 62.5mg po bd  
12-19kg: 125mg po bd  
20-29kg: 187.5mg po bd  
30-40kg: 250mg po bd  
12-18 years: 250-500mg po bd | 7-10 days | For further information please refer to the [BRHC empirical medical antibiotic guidelines](#). |
| Community Acquired Pneumonia Severe (Or unable to absorb oral antibiotics e.g. vomiting) | Co-amoxiclav  
<3 months: 30mg/kg IV bd  
>3 months: 30mg/kg IV tds  
(Max 1.2grams/dose)  
If suspicious of atypical pneumonia add  
Clarithromycin  
1 month-12 years: 7.5mg/kg IV bd  
(Max 500mg/dose)  
12-18 years: 500mg IV bd  
Or for neonates  
Erythromycin  
12.5mg/kg IV qds | Minimum 7-10 days depends on progress | Consider *Staphylococcus aureus* post influenza.  
If specific pathogen identified longer therapy may be required e.g. *S aureus*, atypical or, gram-negative infection.  
If tolerating orals could use oral clarithromycin.  
Oral switch Co-amoxiclav po +/- Clarithromycin |
| Penicillin allergic Not type 1                  | Cefuroxime**  
<7 days: 25-50mg/kg IV bd  
7-21 days: 25-50mg/kg IV tds  
21-28 days: 25-50mg/kg IV qds  
>1 month: 25-50mg/kg IV tds  
(Max 1.5grams/dose)  
If suspicious of atypical pneumonia add  
Clarithromycin  
1 month-12 years: 7.5mg/kg IV bd  
(Max 500mg/dose)  
12-18 years: 500mg IV bd  
Or for neonates  
Erythromycin  
12.5mg/kg IV qds | Minimum 7-10 days depends on progress | Consider *Staphylococcus aureus* post influenza.  
If specific pathogen identified longer therapy may be required e.g. *S aureus*, atypical or, gram-negative infection.  
If tolerating orals could use oral clarithromycin.  
Oral switch, discuss with microbiology. |

For further information please refer to the [BRHC empirical medical antibiotic guidelines](#).
Discharge & Follow-up

- Families discharged home should be given written and verbal advice on managing pain, preventing dehydration and identifying signs of deterioration.
- All children should have a medical review 48 hours after commencing antibiotics to ensure improvement.
- Follow-up chest x-rays are not required in previously healthy children who are recovering well, but should be considered in children with round pneumonia, lobar collapse and persistent symptoms.
- Children with severe pneumonia, empyema and lung abscesses should be followed up after discharge until they have recovered completely and their chest x-ray has returned to near normal.

References


<table>
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<tr>
<th>RELATED DOCUMENTS</th>
<th>BRHC empirical medical antibiotic guidelines</th>
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<tr>
<td>AUTHORISING BODY</td>
<td>Emergency Dept governance group</td>
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<tr>
<td>QUERIES</td>
<td>Duty Paediatric ED consultant or middle grade</td>
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